## REMARKS

In response to the above-noted Office Action, Claims 21 – 24, 29 and 30 have been amended in which the limitations of Claims 26 – 28 which have been cancelled have been incorporated into Claim 21. Additionally, Claims 31 – 40 have been cancelled.

In the Action, Claims 31 – 40 are rejected under 35 USC 112, second paragraph as being indefinite. In response, Claims 31 – 40 have been cancelled.

Claims 21, 27, 31, 33, 34, 37 and 38 have been rejected under 35 USC 102(b) as being anticipated by Palmer. Claims 21, 23 – 25, 27, 31 – 33, 34 and 37 are rejected under 35 USC 102(b) as being anticipated by Schmalz et al. Claims 22, 32, 39 and 40 have been rejected under 35 USC 103 as being unpatentable over Palmer or Schmalz et al. in view of Japanese Patent No. 2002-071416. In response to these rejections, Claims 26 – 28 have been cancelled and their limitations incorporated into Claim 21. Since the foregoing prior art rejections do not include Claim 26 and 28, and the limitations of these claims have been added to Claim 21, and since the remaining claims depend on Claim 21, Applicant submits that these amendments are fully responsive to the foregoing prior art rejections.

Claims 28 – 30, 35 and 36 are rejected under 35 USC 103 as being unpatentable over Palmer or Schmalz et al. in view of Japanese Patent No. 2000-259255. Claim 26 is rejected under 35 USC 103 as being unpatentable over Palmer or Schmaltz et al. in view of Japanese Patent No. 7-314371. Reconsideration and withdrawal of these rejections are requested in view of the following discussion.

**Overview**

The vacuum pick and place device of the present invention can be used, for example, in a mounter apparatus which mounts a chip part on a printed wiring board. Since the mounter apparatus comprises many parts other than the vacuum pick and place device, the vacuum pick and place device is required to be made small. On the other hand, in order to transport many parts at one time, a vacuum pick and place device needs to have a plurality of pick and place nozzles. If a plurality of pick and place nozzles are connected individually through each air suction passage to the vacuum generator which supplies a vacuum pressure, the bundle of the air

suction passage will be made to the connecting part of the vacuum generator and the air suction passage, and the vacuum pick and place device will be enlarged. So, according to the present invention, a plurality of air suction passages are connected to one pipe, and this pipe is connected to the vacuum generator. As a result of this, it becomes possible to reduce the size of the vacuum pick and place device comprising a plurality of pick and place nozzles.

Also, according to the present invention, in order to determine whether each pick and place nozzle has lifted parts, a plurality of pick and place confirming sensors are provided corresponding to each pick and place nozzle. In order to improve the determination accuracy of the presence or absence of the pick and place of a small part, the sensor for measuring the flow rate of air sucked in from an air suction port is used as a pick and place confirming sensor.

When the same vacuum pressure is used in common in a plurality of pick and place nozzles, for example, if only some of the pick and place nozzles are lifting parts, a pressure change occurs in the downstream side of the channel in the pick and place nozzles which have lifted parts at the time of the pick and place of the parts . Since air is a compressible fluid, a pressure change is propagated through the air suction passage and the pipe, and the pressure change is also brought to the pick and place nozzles which have not lifted parts. As a result , the flow rate of air sucked in from the pick and place nozzles which have not lifted parts changes, and the determination accuracy of the presence or absence of the pick and place of parts based on the detection result of the sensor that measures the flow rate is deteriorated. So, according to the present invention, even if a pressure change occurs in the downstream side of a sensor, the flow rate of air sucked in from the pick and place nozzle is made to be constant, and it sucks in so that air may flow at a sonic speed. As a result, it becomes possible to determine accurately whether parts have been lifted by each pick and place nozzle without being influenced by other pick and place nozzles.

**Explanation of cited references**

(1) Palmer (US 4, 653, 741) discloses a technique for determining whether or not air is flowing through a passageway, by providing a flow rate sensor (10) in the passageway communicating from the vacuum pump (16) to the finger member (18), as a vacuum device for lifting paper.

(2) Schmalz et al (US 6,817,639) discloses a technique for determining the negative pressure

control state based on the state of pressure in the channel, by providing the flow sensor (26) in the channel that communicates from the negative pressure generator (16) to the flat suction gripper (12), as a negative pressure operating device that lifts the object.

(3) JP 2002-71416 discloses a thermal air flow rate sensor, and a technique for measuring the intake air quantity of an internal combustion engine using the thermal air flow rate sensor.

(4) JP 2000-25925 discloses a technique that, in the gas supply control device used for a CVD apparatus, gas is supplied at a sonic speed to a chamber (30) by using an orifice (33), and the flow rate of the gas is calculated from the value of the pressure of the upstream side of the orifice.

(5) JP 7-314371 discloses a technique of providing a plurality of suction pads (1) which suck an individual device (2) , and a plurality of optical sensors (101) corresponding to each suction pad as an air suction carrying apparatus for a device.

**Comparison between the present invention and cited references**

As provided in Claim 21, as amended, the present invention comprises a plurality of pick and place nozzles which lift individual parts, and a pipe to which a plurality of air suction passages respectively communicate with wherein each of the plurality of pick and place nozzles is connected in parallel. As a result of providing the pipe with this structure, the apparatus can be made small.

Although JP 7-314371 describes a plurality of suction pads which suck an individual device, no description is made on an element which corresponds to the "pipe" according to the present invention. Further, the element corresponding to the "pipe" of the invention is not described in the other references of record either.

The present invention comprises an element for sucking in air at a sonic speed by each of a plurality of pick and place nozzles. By sucking in air at a sonic speed, it becomes possible to determine accurately whether parts have been lifted by each pick and place nozzle without being influenced by other pick and place nozzles (effect (A)).

In JP 2000-259255, a gas supply control device gases the chamber of a CVD apparatus at a sonic speed. However, the present invention relates to a vacuum pick and place device which makes parts lift to the pick and place nozzle by sucking in air from the pick and place nozzle. Therefore, the technical field of the vacuum pick and place device according to the present

invention is completely different from the one of the gas supply control device according to JP 2000-259255. Applicant submits that a person skilled in the field of the present invention would not look to JP2000-259255 for guidance. Since the other references cited by the Examiner do not provide the sonic speed sucking capability, Claim 21 is patentably distinguishable over the prior art.

Moreover, no description is made by JP 2000-259255 that air is sucked at a sonic speed in each of a plurality of channels branched by the pipes. Even if air is assumed to be sucked at a sonic speed in each of a plurality of suction pads in consideration of JP 2000-259255 and JP 7-314371, the above-mentioned effect (A) which is obtained by the present invention provides an advantage that one having ordinary skill in the art would not expect.

Therefore, the present invention is not obvious based on the prior art references of record.

If there are any fees due in connection with the filing of this response, please charge those fees to our Deposit Account No. 02-2666. If a telephone interview would expedite the prosecution of this Application, the Examiner is invited to contact the undersigned at (310) 207-3800.

**PETITION FOR EXTENSION OF TIME**

Per 37 C.F.R. 1.136(a) and in connection with the Office Action mailed on September 12, 2006, Applicant respectfully petitions Commissioner for a one (1) month extension of time, extending the period for response to January 12, 2007. Attached is a check in the amount of $120 to cover the petition filing fee for a 37 C.F.R. 1.17(a)(1) large entity. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

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Linda Marie Metz January 11, 2007

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